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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/010,429	12/03/2001	Teemu Sipila	324-010624-US (PAR)	7529
2512	7590	07/27/2005	EXAMINER	
PERMAN & GREEN 425 POST ROAD FAIRFIELD, CT 06824			WONG, LINDA	
			ART UNIT	PAPER NUMBER
			2634	

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/010,429

Applicant(s)

SIPILA, TEEMU

Examiner

Linda Wong

Art Unit

2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 20002692, filed on 12/08/2000 in Finland.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 1,2,3** are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshino et al (US Patent No.: 5537443).
 - a. **Claim 1**, Yoshino et al discloses an interference canceller comprising determining a channel impulse response (Fig. 3, labels Channel parameter estimation part), selecting at least one optimum channel impulse response (Fig. 4, label 41), determining a reference signal using at least one impulse response or symbol sequence (Fig. 3, labels 10,20₁,20₂ and 30), performs maximum likelihood sequence estimator (MLSE) (differential terms based on the channel response and symbol sequence, adding those terms and forming a survivor path) (Fig. 4, labels 43 and 42)
 - b. **Claim 2**, Yoshino et al discloses an interference canceller continuously searches for the optimum path, wherein produces multiple reference signals

(Fig. 18A) based multiple channel responses or estimates and symbol sequence.

- c. **Claim 3**, Yoshino et al discloses selecting or choosing the optimum step to create the optimum survival path, which indicates that at least one selected channel response is used to produce a reference signal.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 4-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over

Yoshino et al (US Patent No.: 5537443) in view of Kubo et al (US Patent No.: 6556632).

- d. **Claims 4 and 5**, Although Yoshino et al does not disclose a description of the Viterbi or MLSE algorithm used, Kubo et al discloses a sequence estimator using the Viterbi algorithm, wherein the algorithm is altered to selected the optimum branch metric. The branch metric is calculated using the Euclidean distance algorithm, wherein the branch metric depends on multiple channel responses or estimates (Fig. 2, label 12 and outputs to branch metric) and inherently, provides an increasing in differential terms in the branch metric or transition metric. (page 8, paragraph [0107], lines 1-5, and page 3, paragraph

[0033], lines 1-9) It would be obvious to one skilled in the art to use the Viterbi and/or MLSE algorithm disclosed by Kubo et al to improve channel characteristics using the smallest circuit. (Abstract, lines 11-13)

- e. **Claim 6**, Although Yoshinio et al does not disclose a description of the Viterbi or MLSE algorithm used, Kubo et al discloses a branch metric or transition metric, wherein the branch metric depends on the channel characteristics. Kubo et al inherently discloses the length of the branch metric would depend on the channel characteristics. (page 4, paragraph [0037] and page 8, paragraph [0107], lines 1-5) It would be obvious to one skilled in the art to use the Viterbi and/or MLSE algorithm disclosed by Kubo et al to improve channel characteristics using the smallest circuit. (Abstract, lines 11-13)
- f. **Claim 7**, Kubo et al discloses differential terms of the channel response depend on the characteristics of the channel response, which indicates that the magnitude of the channel is considered. (page 8, paragraph [0107] ,lines 1-5)
- g. **Claim 8**, Kubo et al discloses selecting optimum channel response or branch metric. (page 4, paragraph [0050]). It would be obvious to one skilled in the art to use the Viterbi and/or MLSE algorithm disclosed by Kubo et al to improve channel characteristics using the smallest circuit. (Abstract, lines 11-13)
- h. **Claim 9**, Kubo et al discloses differential terms using squared Euclidean distance. (Kubo et al page 1, paragraph [0033], lines 7-8) It would be obvious to one skilled in the art to use the Viterbi and/or MLSE algorithm disclosed by

Kubo et al to improve channel characteristics using the smallest circuit.

(Abstract, lines 11-13)

- i. **Claim 10**, Yoshino et al discloses applying tap coefficients or weights to output the selected channel impulse response. (Col. 11, lines 41-10)
- j. **Claim 11**, Yoshino et al discloses calculating the desired signal estimation and interference estimation using the correlation between the channel impulse response, the signal received and sequence candidates or symbols. (Abstract and Col. 10, lines 63-67 and Col. 11, lines 1-32)
- k. **Claim 12**, Kubo et al discloses adding the branch metric to form a path metric. (Col. 3, lines 37-44) It would be obvious to one skilled in the art to use the Viterbi and/or MLSE algorithm disclosed by Kubo et al to improve channel characteristics using the smallest circuit. (Abstract, lines 11-13)
- l. **Claims 13 and 14**, it is obvious to one skilled in the art to use a computer, comprising components such as memory and software, to perform the method of finding the optimum path. It would be obvious to one skilled in the art to use a computer to compute the method to provide a quicker result and more efficient method of determining the optimum path.
- m. **Claim 15** inherits all the limitations of claim 1.
- n. **Claim 16** inherits all the limitations of claim 2.
- o. **Claim 17** inherits all the limitations of claim 3.
- p. **Claim 18** inherits all the limitations of claim 4.
- q. **Claim 19** inherits all the limitations of claim 5.

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- r. **Claim 20** inherits all the limitations of claim 6.
- s. **Claim 21** inherits all the limitations of claim 7.
- t. **Claim 22** inherits all the limitations of claim 8.
- u. **Claim 23** inherits all the limitations of claim 9.
- v. **Claim 24** inherits all the limitations of claim 10.
- w. **Claim 25** inherits all the limitations of claim 11.
- x. **Claim 26** inherits all the limitations of claim 12.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Linda Wong whose telephone number is 571-272-6044. The examiner can normally be reached on 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571) 272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LW



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